

→ CAFS FOR 2021 PDC - DAY 3

ESA's NEO Coordination Centre

This document does not describe a real potential asteroid impact. The information here is fictional and provided only to support an emergency response exercise conducted during the International Academy of Astronautics (IAA) 2021 Planetary Defense Conference (virtually) in Vienna, Austria, 26-30 April 2021. This is only an exercise.

Close approach fact sheet for asteroid 2021PDC

Status as of: 2021 June 30 12:30 UTC.

A large asteroid has 100% probability to impact the Earth in 20 October. NEOCC is providing this CAFS as this case fulfils the criteria of both ESA and IAWN for generating an *impact warning message*.

Possible impact date	2021-10-20
Possible impact time	~ 17:13 UTC
Velocity at entry interface point	~ 15.43 km/s
Size range	76-226 m
Discovery date	2021-04-19
Discovery site	PDC EXERCISE

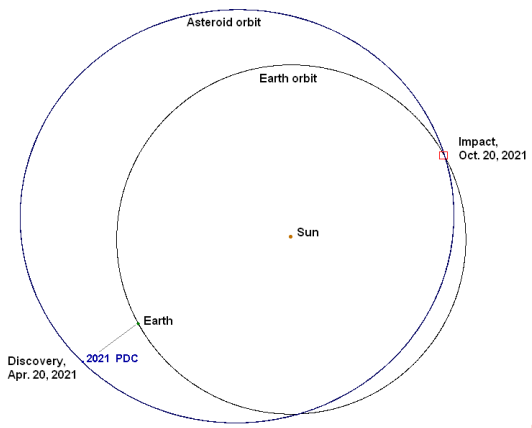
All error bars quoted in this table correspond to one standard deviation.

Orbit information

All orbital elements in this table are referred to the ecliptic reference system at J2000.0 epoch and to the pre-impact conditions.

Date before the possible impact	Orbital period (years/days)	Aphelion distance (au)	Perihelion distance (au)	Eccentricity	Inclination (deg)
2021-09-19	1.41/515	1.596	0.923	0.2673	15.73

EXERCISE



Source: JPL

EXERCISE

Physical and mitigation information

Days to closest approach	Impact probability	Composition	Rotation period (hours)
~ 112	1	Unknown	Unknown

Observational information

The asteroid continues to be tracked almost every night and will remain observable from now until the potential impact. Even larger telescopes will now be required for these observations, since the asteroid has become very faint and will remain so until September.

Other information

Encounter peculiarities	Previous encounter	Next encounter
Impact predicted	2014-06-06	Unknown

Only encounters within 0.05 au are considered.

Links

NEO information:

<https://neo.ssa.esa.int/pdc-2021-impact-exercise>

Close approaches page:

<https://neo.ssa.esa.int/close-approaches>

neo.ssa.esa.int

For further information please send an email to neocc@ssa.esa.int



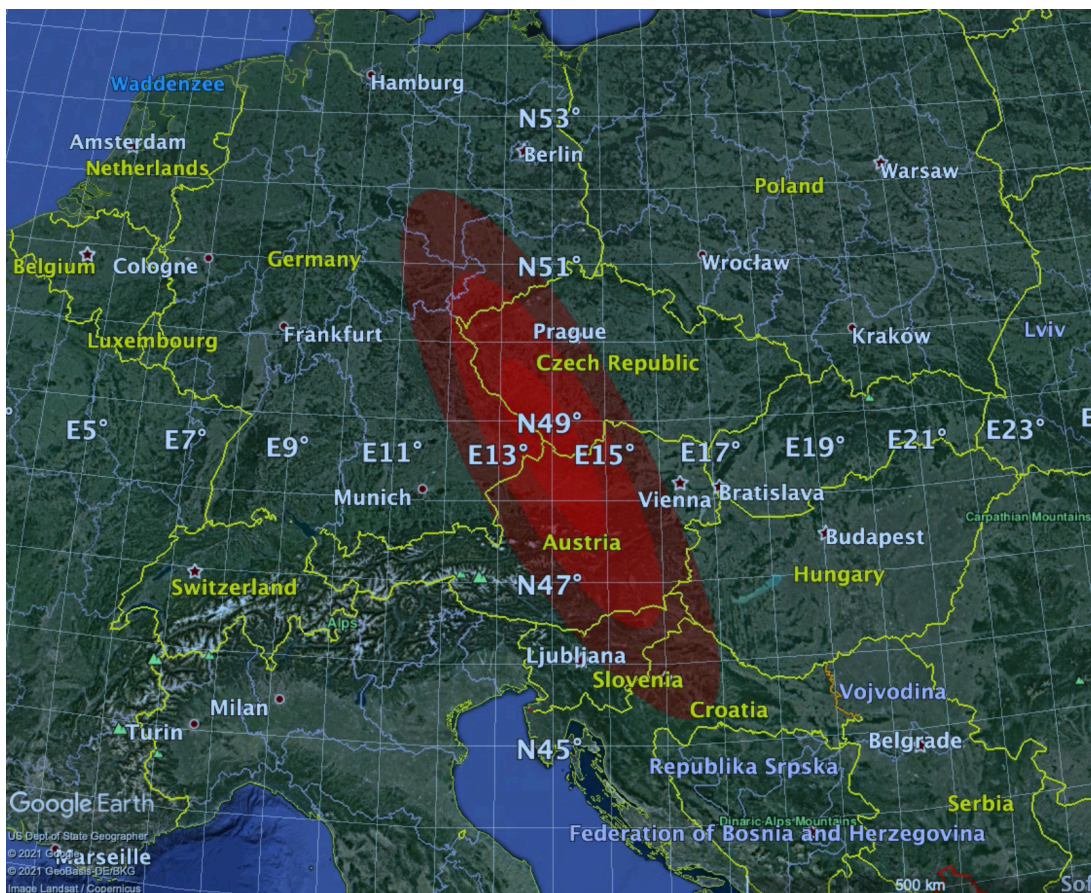
Impact risk information sheet for asteroid 2021PDC

Impact information

Size (m)	Impact date (UTC)	IP	TS	Velocity (km/s)	Angle (°)	Expected energy (Mt TNT equiv.)
76-226	2021-10-20 17:13:00	1	9	15.43	30-60	60-237

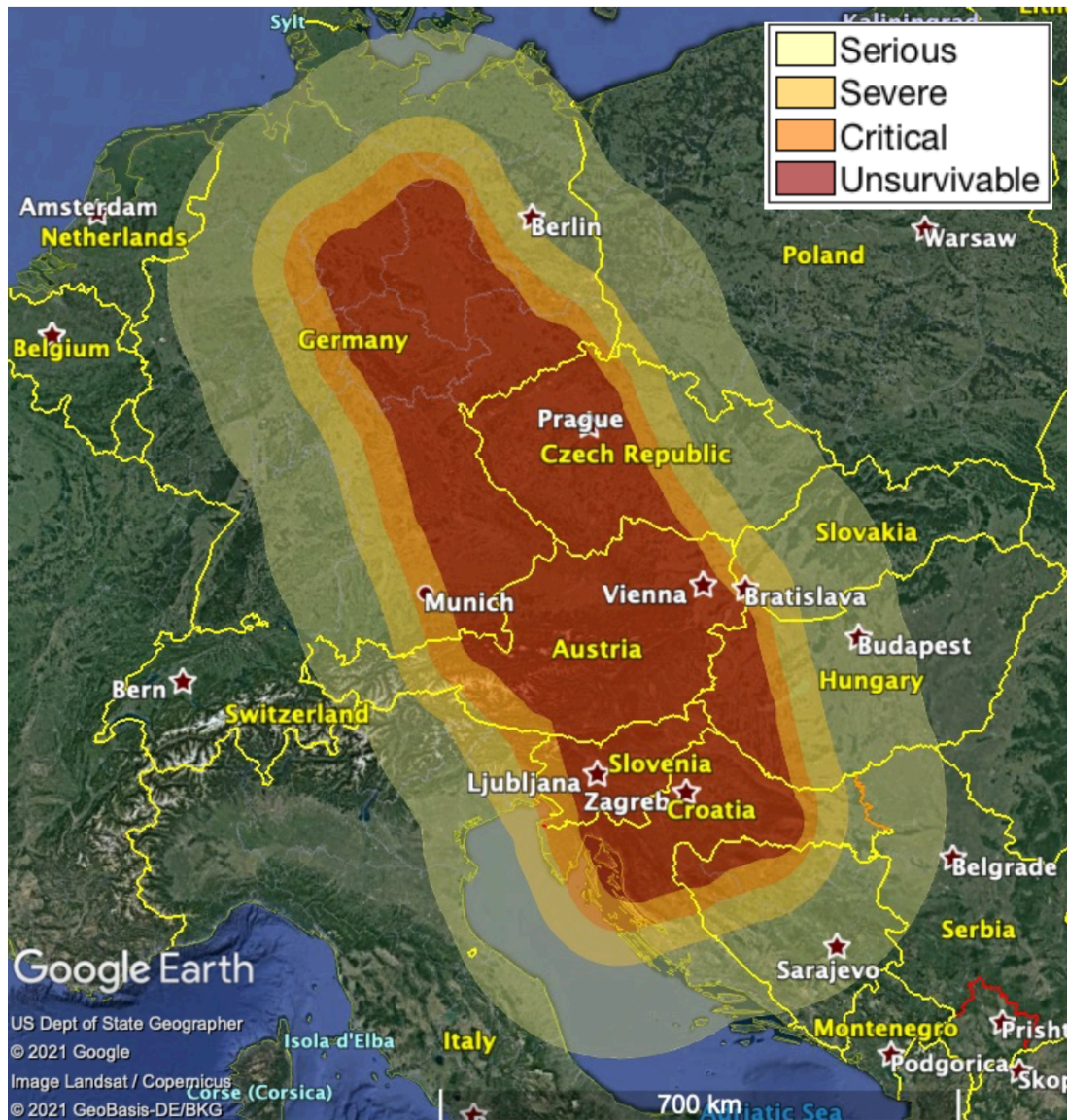
Impact corridor plot

The impact is expected to occur somewhere within an area of central Europe roughly 800 km long by 250 km wide. Countries in which the impact may occur include Germany, Czech Republic, Austria, Slovenia and Croatia (see first image below). These and other surrounding countries lie within a larger damage risk swath, about 1400 km long by 700 km wide, where serious impact damage is possible (see second image below).



The image delineates the region where the impact is most likely to occur. There is a 99% chance the impact will be located within the large shaded region, an 87% chance it will occur within the middle contour, and 40% inside the central dark red region. Future predicted impact regions will be smaller, and they will nest within the current large shaded region. Source: JPL.





The image shows the region of potential damage risk, which is much larger than the region in the previous image because serious damage could extend for tens or even hundreds of kilometers around the impact point. This potential damage risk region is about 1400 kilometers long by 700 kilometers wide. Source: JPL.

Impact effects

The predominant hazard is an airburst causing blast overpressures possibly reaching unsurvivable levels. The size of the potential blast damage area could range from local (a few kilometers) at the small end at the possible range of asteroid sizes, to regional (several tens of kilometers) at the large end.

Simulations estimate the affected population to range from 10 000 to over 1 million people, with an average estimate of ~ 580 000 people.

Owed to uncertainties in the measurements, the real object diameter and density might even vary more than accounted for in the standard assumptions. The full possible diameter range is 35 to 700 m and the full range of potential impact energies ranges from 1.2 Mt TNT equivalent up to ~ 1.5 Gt TNT equivalent.

